

# **GRADUATE SCHOOL OF MEDICAL SCIENCES**

**Cornell University Medical College**

**1300 York Avenue, New York 21, N.Y.**

**1958-1959 and 1959-1960**

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# CORNELL UNIVERSITY

## GRADUATE SCHOOL OF

### MEDICAL SCIENCES

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# **CORNELL UNIVERSITY**

## **MEDICAL COLLEGE**

### **GRADUATE SCHOOL HISTORY**

**W**ORK leading to an advanced degree was first offered in the Medical College in 1912 as a cooperative arrangement with the Graduate School of Cornell University. Under the plan as originally announced, students registered for an advanced degree in the Medical College, but in all respects they were subject to the rules and regulations prevailing at the University. The departments offering graduate instruction were identified in the first announcement merely as the "scientific departments."

Graduate work has continued to occupy a place in the Medical College since the year it was established, and advanced degrees have been awarded in anatomy, bacteriology and immunology, biochemistry, pathology, pharmacology, physiology and biophysics, and public health and preventive medicine.

In June, 1950, the trustees of Cornell University approved an arrangement whereby the Sloan-Kettering Institute became a part of the Graduate School division of the Medical College for the purpose of offering instruction leading to graduate degrees in the basic science fields. Although the Cornell University Medical College and the Sloan-Kettering Institute were already closely associated, this arrangement made possible the extension of graduate work into certain specialized areas, especially in the field of cancer. This expansion of the New York City component of the Graduate School prompted the Graduate faculty of the University to give consideration to matters of administration with the result that by action of the trustees in January, 1952, the Graduate School of Medical Sciences was established, which, with the approval of the Graduate faculty of Cornell University, "shall have full responsibility for advanced and professional degrees granted for study in residence at the New York City campus of Cornell University."

### **FACILITIES**

#### **THE MEDICAL COLLEGE**

The five buildings of the College extending along York Avenue from Sixty-eighth to Seventieth Streets contain the classrooms, student labo-



ratories, library, and research facilities for undergraduate work. The regular course of instruction to medical students is conducted for the most part on the second and third floors of the Medical College. Students in the Graduate School carry on their work on all floors of the College buildings. They are not only eligible to take any of the subjects with the regular medical students, but in most instances certain of these courses are required of the candidate for an advanced degree.

## **THE SLOAN-KETTERING INSTITUTE**

The Memorial Center for Cancer and Allied Diseases comprises the city block between York and First Avenues from Sixty-seventh to Sixty-eighth Streets. In the center of the group of buildings on the Sixty-eighth Street side is located the Sloan-Kettering Institute, a thirteen-story structure, devoted primarily to research work pertaining to cancer and allied conditions. Ample opportunities for advanced training are offered in the Institute by reason of its special facilities and its staff of experienced investigators. On the several floors of the building are located laboratories and modern equipment for studies in bacteriology, biochemistry, biophysics, cell physiology, experimental cancer chemotherapy, experimental pathology, immunochemistry, pharmacology, radiation biology, steroid metabolism, and virology.

## **ORGANIZATION AND PURPOSE OF THE GRADUATE SCHOOL**

The Graduate School of Medical Sciences offers work leading to the degrees of M.S. and Ph.D. in the basic science fields.

The Dean of the Medical College, who holds the additional title of Associate Dean of the Graduate School of Medical Sciences, is the administrative head, and as the responsible officer he is required to report annually to the Graduate faculty of Cornell University for approval of the activities of the Graduate School of Medical Sciences.

The faculty includes the professors, associate professors, and assistant professors in all departments of the Medical College (excepting those in the clinical fields) and all members in the three professorial ranks in the Sloan-Kettering Division. Members of the staff holding appointments in the rank of associate or instructor may also take part in the teaching of graduate students. They are not eligible, however, to take the responsibility for the total work of a graduate student.

It is the purpose of the Graduate School of Medical Sciences of Cornell University to offer facilities for advanced study and research so that students may obtain a comprehensive view of a field of knowledge and receive the training required for independent investigation in that field. In providing this opportunity, the School makes it possible for

the students to associate freely with mature scholars who will give them such aid and direction as they may need. Accomplishment is judged primarily by the evidence of growing responsibility for the advancement of knowledge and not by fulfillment of routine requirements or by courses and credits.

## THE COMMITTEE ON GRADUATE STUDY

The Committee on Graduate Study is both an administrative and a judicial board of the Graduate School, and its membership has continuing responsibility for the School. It is the duty of the Committee to consider such matters as are referred to it by the faculty or by the members of the faculty, and upon its own initiative to make recommendations to the faculty regarding questions involving the interests or policies of the Graduate School.

The Associate Dean serves as chairman of the Committee on Graduate Study with four members of the Graduate faculty. Two members of the Committee represent the faculty of Sloan-Kettering Division and the remaining two members are chosen from the faculty in the basic science fields of the Medical College. The faculty members of the Committee are nominated by the Associate Dean and appointed annually by the President of the University.

This board of the Graduate faculty serves as an agency for (1) approval and administration of the admission of students; (2) approval of major and minor subjects; (3) allotment of units of credit toward advanced degrees; (4) supervision of nominations and administration of fellowships and scholarships; (5) selection of members of the faculty to conduct and make recommendations in the fulfillment of the language requirements; (6) the solution of student problems involving academic irresponsibility.

## ADMISSION

To be admitted, an applicant (1) must hold a Bachelor's degree from a college or university of recognized standing, or must have done work equivalent to that required for such a degree; (2) must have adequate preparation in the chosen Field of Instruction; and (3) as judged by his previous scholastic record or other achievements, must show promise of doing well in advanced study and research.

A student is not encouraged to apply for admission until he has conferred with a faculty member connected with one of the major disciplines in either the Medical College or the Sloan-Kettering Division and obtained the consent of a professor to sponsor the program he proposes to undertake. The faculty member in agreeing to sponsor a student for major work becomes responsible (provided the student is

accepted) for the administration and long-range planning of a balanced program of graduate study for the candidate. In consultation with other faculty members the sponsor organizes and acts as chairman of a faculty group, or Special Committee, whose members consist of those participating in teaching in the student's minor fields. The sponsor shall prepare reports for the Associate Dean concerning grades made in formal courses and performance in research; he shall make requests for Qualifying and Final Examinations.

Scores made in the Graduate Record Examination, although not required, will prove helpful in determining the acceptability of the applicant. Students who plan to take this examination should communicate directly with the Educational Testing Service, P.O. Box 592, Princeton, New Jersey.

For students planning to take up graduate work at the beginning of the academic year in September, the application and all supporting data should be in the Office of the Graduate School at the Medical College not later than March 1.

A student is not admitted to the Graduate School until a formal notice of acceptance has been issued by the Associate Dean of the Graduate School of Medical Sciences. If the candidate is accepted with conditions, these will be recorded in the notice of admission.

## REGISTRATION

Students taking work in the Graduate School leading to, or in contemplation of, an advanced degree must register in the Administration Office of the Medical College at the beginning of each academic year. It is expected that students matriculated in the Graduate School of Medical Sciences will continue for the full academic year. In the event, however, that circumstances require attendance for less than a year, special arrangements may be made for registering for one semester. A graduate student who has completed the requirements of residence for his degree and who remains in residence while working on his thesis or while doing other work in contemplation of a degree must register each term in which he is thus engaged.

A graduate student who discontinues his work for any reason during a term in which he is registered should immediately report this fact to the Associate Dean in order to obtain an official withdrawal or an honorable dismissal.

## MAJOR AND MINOR SUBJECTS

The curriculum of a candidate for the degree of M.S. includes one major and one minor subject; of a candidate for the degree of Ph.D., one major and two minor subjects. Approved subjects are listed below

as separate fields of instruction, where some information is given about them. The faculty believes that in the main the ultimate aims of candidacy are best attained by the candidate's selecting two minor subjects outside the field of his major and a program of study arranged so as to contain a balance of research and course work leading to a high standard of proficiency.

## **RESIDENCE REQUIREMENTS**

The faculty regards study in residence as essential. Although requisite depth results from intensive study of a major subject and properly related minor subjects, candidates for an advanced degree should avoid overspecialization. The faculty requires of each candidate for a Master's degree a minimum of two residence units, and for the doctorate, a minimum of six residence units; one residence unit represents one academic semester of full-time study.

Graduate students who participate in teaching or research work do not qualify for full residence credit although their duties usually will lie in the field of their major interest and contribute to their intellectual and technical proficiency. In general a student who gives time to a related service, not to exceed 6 hours a week, is eligible for full credit. If his ancillary duties require 20 hours a week, the earned credit ordinarily will not exceed  $\frac{3}{4}$  of a unit each semester. By earning an additional  $\frac{1}{2}$  unit in summer research, he may earn 2 full units in a calendar year. But as a rule the Committee on Graduate Study will not permit anyone to receive credit for more than two units in any period of twelve consecutive months. Eligibility to receive residence units and fractions of units is determined by the Committee on Graduate Study for each student individually.

Since no degree is granted unless the candidate has studied in residence for at least two semesters, no residence unit or fraction is granted in fulfillment of the requirements for a Master's degree for study outside this Graduate School. No commitment may be made for acceptance of previous study in another graduate school in lieu of required residence until after the candidate has entered into study in residence in the Graduate School. Then the residence units, which are evaluated by the Committee on Graduate Study on the basis of a transcript of record and other credentials, may not exceed those that would be earned under similar circumstances at Cornell University, and the passing of courses or the acquirement of credit hours is not regarded as evidence satisfactory in itself for transfer of credit. Study as a candidate or as a special student in an undergraduate college is not acceptable, even though the courses may be designed for graduate students. A candidate for the degree of Ph.D. must complete two of the last four units in successive terms of study at the Graduate School of Medical Sciences.



In instances, however, where a candidate is taking a portion of his work under a cooperative arrangement with departments located on the University campus at Ithaca, an exception may be made to this regulation.

Each candidate for an advanced degree is expected to complete his study in residence with reasonable continuity. A candidate who fails to register during any period of four or more years is dropped from candidacy and may be readmitted only after the Committee on Graduate Study has stipulated the amount of additional residence to be required. No more than ten years may intervene between the time of first registration and the completion of all requirements for a doctorate degree.

## LANGUAGE REQUIREMENTS

Students planning graduate study leading to an M.S. or Ph.D. degree must demonstrate proficiency in one language within the first semester following acceptance. This requirement cannot be satisfied by a language test passed in fulfillment of requirements for an advanced degree in another graduate school.

To demonstrate proficiency, the candidate is required to pass a general examination. The examination will consist of passages from the biological sciences designed to test the student's ability to translate a representative piece of prose. The examination will be graded "pass" or "fail" on the basis of whether the student has demonstrated sufficient speed and accuracy to make language a useful instrument for research. The use of a dictionary is allowed. A vocabulary test may be required in addition to the above general examination.

For the M.S. degree a reading knowledge of either French or German will fulfill the requirement. Failure to pass the language may require the candidate to complete three units of residence credits for the degree. The student will be expected to demonstrate proficiency before beginning the third residence unit.

Students matriculated for the doctoral degree must demonstrate proficiency in two languages in addition to the one the candidate commonly uses. Proficiency in English and German is required, and for the third language, either French, Spanish, or Russian will fulfill the language requirement. The second language examination should be taken as soon as possible after admission to candidacy. Until it is passed, no residence units beyond four will be allowed.

## EXAMINATIONS

Three oral or oral and written examinations are required by the Graduate faculty: (1) a final examination for the Master's degree; (2) a qualifying examination for the degree of Ph.D.; (3) a final examination

for the degree of Ph.D. Under certain regulations (1) and (2) may be combined. The qualifying examination should be taken as early as possible; at all events, the candidate must complete at least three units of residence after passing it.

The doctorate examination is in two parts spaced so as to allow an interval of not less than four months between each part. The first part (Exam. A) is on the major and minor subject matter of the candidate's graduate work. For students expecting to get their degrees at the June Commencement, this examination must be passed before January first preceding the graduation date.

The second part (Exam. B) of the candidate's final examination is on the thesis and related material and must be scheduled not later than the first week in May when all work on the thesis has been completed and approved by the professors sponsoring the student's graduate program.

Students completing their work at another time of the year are expected to follow a time schedule approximately the same as that for the candidate who intends to complete the requirements at the end of the academic year. The Associate Dean schedules the examinations and notifies the members of the Graduate faculty so that any member may attend who wishes to do so.

## **GRADES**

Credit for graduate work is given only when the candidate maintains a satisfactory standard of performance in both his major and his minor fields of study. Professors having charge of the work of graduate students are required to report to the Associate Dean of the Graduate School of Medical Sciences at the end of each semester, or at the close of each academic year, grade ratings on all students taking work under their direction. These grade reports are given in the following terms: A (93-100%), B (84-92%), C (75-83%) for passable performance, and F for work unacceptable for credit. Students whose grade falls below a B may be separated from the Graduate School program.

## **THESES**

Research accomplishment presented in the form of a thesis is a principal requirement for both the M.S. and Ph.D. degrees.

Students enrolled for the Master's degree are required to prepare a report on some problem or project undertaken in their major field. In content and form this report must show scholarly attainment.

A copy of the thesis shall be submitted to the professor who sponsors the major work of the student at least six weeks before the date the degree is to be awarded.

Doctoral theses must show ability to do critical and independent investigation, must be a contribution to knowledge, and must be presented in a scholarly fashion. They should reflect not only a mastery of a field of research, but the ability to select an important problem for investigation and to deal with it competently. A request for the final examination will be issued only after a written notice has been given to the Associate Dean by the professor in charge of the candidate's major that the thesis is approved.

The plan in effect in the Graduate School of Cornell University of using the facilities of the University Microfilms, Ann Arbor, Michigan, has been adopted by the faculty of the Medical College. This arrangement provides for publication of the thesis on microfilm and for the publication of an abstract of the dissertation of not more than 600 words in the monthly publication entitled *Dissertation Abstracts*.

The thesis must be typewritten, double-spaced, on durable rag bond 8½ by 11 inches, with a left-hand margin of at least an inch and a quarter. A new black ribbon should be used so as to obtain a clear dense copy for each page, and the ribbon copy (original) must be deposited with the Associate Dean for transfer to the Medical College Library and for microfilming. One carbon copy, which should be on paper of lighter weight than bond, is also required for deposit in the department where the thesis work was done. Both the original and the one carbon copy of the thesis are submitted unbound.

## NONCANDIDATES

Wherever staff and facilities are available, students may be admitted as noncandidates and register for such formal or informal instruction as they are adequately prepared to undertake. The work of a noncandidate is under the supervision of an adviser selected by the student and approved by the Associate Dean. He is subject to the general regulations of the Graduate faculty.

If, for some reason, a student is not considered to be completely qualified for candidacy, he may be admitted as a provisional candidate. In such instances the noncandidate may reapply for admission to candidacy after a period of study not exceeding two semesters. If he is admitted into candidacy, he is not allowed to transfer more than one semester of study in fulfillment of residence requirements.

A student desiring to change from noncandidacy to candidacy, or from a Master's degree to a Doctor's degree without completing the former, must file a new application with the Associate Dean.

## EXPENSES

A fee of \$1,250 an academic year must be paid by all students registered in the Graduate School of Medical Sciences. This is an inclusive

fee with \$1,100 of the amount apportioned for tuition and the remainder for all accessory items; namely, matriculation, student hospitalization insurance, laboratory charges, graduation fee, microfilming of the doctoral thesis, publishing the abstract in the monthly periodical, *Dissertation Abstracts*, mailing the thesis and abstract to and from the microfilm publishers, binding two copies of the thesis, and the tuition fee. The fee is due at the beginning of the academic year, or in two equal parts of \$625 at the beginning of the fall and spring semesters.

Graduate students who have completed the minimum residence requirements (six units) for the Ph.D. degree and have paid the tuition fees for that degree may complete their thesis in residence and take the final examinations by registering as candidates for degree only, and no additional tuition payment will be required of them.

The head of a department may recommend that a certain graduate student is needed in the teaching program, and, if approved by the Associate Dean, a salary will be given to the student in an amount equal to his tuition, but exclusive of other fees. The tuition charge as such, however, is not waived in any instance.

Tuition or other fees may be changed by the Trustees at any time without previous notice.

## **STUDENT HEALTH SERVICE**

Complete ambulatory medical care is provided for all students matriculated in the Graduate School of Medical Sciences through the Personnel Health Service of the Medical Center. Students matriculating for the first time in the Graduate School are required to have a physical examination by a member of the Health Service staff. In addition each student must report for a chest X-ray examination, tuberculin test, and such immunizations as may be considered necessary at periodic intervals. No charge is made for medical care through the Health Service or for any X-rays, laboratory tests, or procedures which may be needed. Each student is required to carry Associated Hospital Service (Blue Cross) hospitalization insurance unless some similar hospitalization insurance is currently in effect through a previous policy. The cost of this insurance for an unmarried student is included in the "Expense" fee. Wives and dependents of students may be covered by the hospitalization insurance policy for a small additional fee. Office hours are held daily from 12:30 to 1:30 p.m. by the Student Health staff. All cases of illness must be reported to the Health Service. Students may have in attendance physicians of their own choice, but a reasonable amount of cooperation between such physicians and the College Health Service is expected. Wives and families of students are not eligible for care through the Personnel Health Service but will be referred to appropriate members of the hospital staff for medical care.



## SUMMARY OF REGULATIONS FOR GRADUATE DEGREES

Students contemplating admission to graduate work leading to the M.S or Ph.D. degree must first obtain the approval of their program from a member of the faculty. If encouraged by the faculty member to proceed, the student may file his application (see page 10).

When registered for one of these degrees, the candidate should observe carefully the following requirements.

### FOR THE MASTER'S DEGREE

He must—

1. Complete a minimum of two units\* of work in residence, including a major and one minor course of study.
2. Demonstrate proficiency in one foreign language.
3. Pass a final examination covering his general field of study.
4. Present a thesis approved by the professor representing his major field of study and the Committee on Graduate Study.
5. Submit two typewritten copies of the thesis, one for filing in the Medical College Library and the other for the department representing his major field of study.

### FOR THE PH.D. DEGREE

He must—

1. Complete six units\* of training in residence, of which two units of the last four must be taken in successive terms at the Medical College or the Sloan-Kettering Institute.
2. Demonstrate proficiency in two languages approved by the Committee on Graduate Study.
3. Achieve a high level of scholarly capacity (grade of B or better) and demonstrate the ability and technique necessary for carrying on original work.
4. Complete the following examinations: (A) a qualifying examination before three units are finished of the six required for the doctoral degree, and (B) the final examinations (see page 13).
5. Present a thesis in the major field of study, which must represent a contribution to the subject investigated.
6. Prepare an abstract of the approved thesis for publication in *Dissertation Abstracts*.
7. Submit two unbound typewritten copies of the thesis, one for filing in the Medical College Library and the other for the department representing the major field of study.

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\*One unit is equivalent to a semester of full-time study.

## **FIELDS OF INSTRUCTION**

**T**HE SEVERAL fields of instruction of the Graduate School of Medical Sciences are described in the pages that follow. The title of each field is an approved major or minor subject for candidates for advanced degrees.

### **INSTRUCTION AT THE MEDICAL COLLEGE**

#### **ANATOMY**

*Professor* DON W. FAWCETT

*Associate Professor* JOHN MACLEOD

*Assistant Professors* WILBUR D. HAGAMEN, LEONARD L. ROSS, ELIZABETH D. HAY

Facilities are available for graduate study in various areas of the broad subject of anatomy; in histology, cytology, electron microscopy, neuroanatomy, experimental neurology, endocrinology, embryology, and gross human anatomy. Students desiring to pursue graduate work in anatomy must have had adequate preliminary training at college level in physics, chemistry, and biology. The specific course requirements for either a major or a minor in anatomy will be determined for each candidate after consultation with the authorized representatives of the other departments involved.

#### **BIOCHEMISTRY**

*Professor* VINCENT DU VIGNEAUD

*Associate Professor* ROY BONSNES, DONALD B. MELVILLE, JULIAN R. RACHELE

*Assistant Professors* HELENA GILDER, WILLIAM D. CASH

Opportunity is offered for advanced work and research in various phases of biochemistry. Adequate chemical and physical equipment and library facilities are provided for the investigation of a considerable variety of problems in the chemistry of the animal and human organism in health and disease.

Graduate students expecting to pursue investigations in biochemistry should have adequate training in inorganic, organic, analytical, and physical chemistry.

Students electing biochemistry as a minor subject are expected to complete the regular medical course in biochemistry, or its equivalent, as a minimum requirement.

#### **MICROBIOLOGY AND IMMUNOLOGY**

*Professor* JAMES M. NEILL

*Associate Professor* JOHN Y. SUGG

*Assistant Professor* IRVING ABRAHAM

Facilities are available for advanced study and investigation over a broad range in the general field of microbiology and immunology, including practical aspects of the etiology, epidemiology, and pathogenesis of infectious disease, and of hyper-

sensitive phenomena; and also aspects of fundamental importance whose practical application may not be immediately apparent. A graduate student may elect investigations in any of the various fields, but the opportunities are best for students who direct their major interest toward fields of current investigation of the department. These fields at present include variations in antigenicity and in pathogenicity of influenza viruses; hypersensitive reactions to antibiotics; serological properties of bacterial polysaccharides; immunological aspects of fungi and of mycotic infections; and immunological phenomena encountered in helminth infections.

Prospective majors in the department should have had several college courses in chemistry, physics, and biology. As a rule, considerably more training in chemistry is expected than is needed to meet the minimum requirements for entrance to medical college, but unusual training or experience in any one of the sciences will be taken into account in the consideration of candidates who may have had less than the usual training in others.

## **PATHOLOGY**

*Professors* JOHN G. KIDD, JOHN M. PEARCE

*Associate Professors* JOHN T. ELLIS, AARON KELLNER, GEORGE E. MURPHY, GOETZ W.

RICHTER, F. STEPHEN VOGEL

*Assistant Professors* ROBERT L. HIRSCH, JOHN F. SEYBOLT

The department offers wide opportunity for the experimental study of disease. Adequate facilities for the care of animals are available. There is a departmental library where some of the current journals and reference books are kept on file. The main library is situated on the floor immediately beneath the department and is readily accessible. There is a carefully selected collection of mounted museum specimens, in addition to an active file of preserved gross material for study. The histological collection is likewise rich in material. Autopsies for the entire hospital are performed by the members of the department and offer an opportunity for the study of fresh pathological tissues.

No regular course of study is offered by the department for graduate students, but applicants in this field are given abundant opportunity for special work under the direct supervision of members of the department. Such work may include the investigation of some problem and may be credited toward the applicant's graduate degree.

## **PHARMACOLOGY**

*Professors* WALTER F. RIKER, JR., McKEEN CATTELL, HARRY GOLD

*Associate Professors* WALTER MODELL, GERHARD WERNER

*Assistant Professors* JOSEPH F. REILLY, JAY ROBERTS

Facilities are available for advanced work and research in the chemical, pharmacodynamic, and clinical aspects of pharmacology. Special opportunities are afforded for work in general pharmacology, neuropharmacology, cardiovascular pharmacology, and drug evaluation in man. The department is well equipped with specialized apparatus for electrophysiological techniques and contains a small but complete unit for organic chemistry.

In graduate training, emphasis is placed on a sound basic training in general pharmacology. By means of individual instruction, the candidate is later afforded an exposure to several specialized aspects of pharmacology. The latter part of the graduate curriculum is devoted to research in an area of the candidate's choice.

An adequate preliminary training in organic chemistry, physical chemistry, biochemistry, and physiology is prerequisite for graduate work in pharmacology. A training in statistics is strongly recommended.

## PHYSIOLOGY AND BIOPHYSICS

*Professor* ROBERT F. PITTS

*Associate Professors* ROGER L. GREIF, ROY C. SWAN

*Assistant Professors* GERHARD H. GIEBISCH, HAROLD G. HEMPLING

Graduate and research training is provided for students who wish to prepare themselves for teaching and research in the physiological aspects of biological science, with special emphasis on the physical and chemical approach; those who desire to prepare themselves more adequately for clinical practice and research by advanced training in some phase of physiology; and those who are entering a career in human biology.

Instruction is at first provided through the medium of formal basic courses in this and other departments of the Medical College, and in the departments of physics and chemistry of neighboring universities. This work is paralleled by similar courses which deal with specialized subjects on a more advanced level. Finally, the student is associated with various members of the staff on a tutorial basis for instruction in special research problems.

## PUBLIC HEALTH AND PREVENTIVE MEDICINE

*Professor* WALSH McDERMOTT

*Associate Professor* EDWIN D. KILBOURNE

*Assistant Professors* JOHN ADAIR, IRWIN D. J. BROSS, KURT W. DEUSCHLE, BENJAMIN H. KEAN, JAMES MCCARROLL, ROBERT McCUNE

In this department of the Medical College, a graduate degree (Ph.D.) may be obtained in certain of the medical sciences as they relate to public health. Microbiology is a field of special interest of the department; advanced training and instruction are available in parasitology, bacteriology, and virology.

The Department of Public Health and Preventive Medicine does not offer formal graduate courses in public health, and the University does not grant a Master's degree or a doctorate in public health.

## INSTRUCTION AT THE SLOAN-KETTERING INSTITUTE

C. P. RHODS, *Director*

The training offered in this division of the Graduate School of Medical Sciences is primarily for candidates with the Master's degree or equivalent. The candidate's record is reviewed, and recommendations for additional course work may be made from courses available in the City. In addition to advanced students, the division will offer opportunities to a limited number of students who have recently received the baccalaureate degree. Lecture and laboratory courses prescribed by the faculty for such students will preferably, though not necessarily, be taken at the Ithaca campus.

As one of the principal aims of this division is to train investigators in methods of quantitative biology, a series of specialized lecture and seminar courses in this area will be offered. The lecture courses are concerned with modern methods, and are designed to complement and supplement courses available elsewhere.

## BIOCHEMISTRY

*Professors* OSCAR BODANSKY, GEORGE B. BROWN, THOMAS F. GALLAGHER

*Associate Professors* AARON BENDICH, LIEBE F. CAVALIERI, DAVID K. FUKUSHIMA, MARY L. PETERMANN



*Assistant Professors* M. EARL BALIS, H. LEON BRADLOW, JACK J. FOX, LEONHARD KORN-GOLD, ROBERT S. ROSENFELD, MORTON K. SCHWARTZ, HELEN Q. WOODARD

Training is available in the following fields: electrolyte metabolism; enzymology; immunochemistry; chemistry and metabolism of proteins, especially nucleoproteins; chemistry and metabolism of steroids.

Prerequisites include acceptable graduate courses in organic and physical chemistry, biochemistry, and physiology, together with additional requirements in conformance with the individual desires of the students and the interests of the staff.

## BIOLOGY AND GROWTH

*Professors* A. J. DALTON (Biology), FREDERICK S. PHILIPS (Pharmacology), C. P. RHODES (Pathology), C. CHESTER STOCK (Biochemistry), GEORGE W. WOOLLEY (Biology)

*Associate Professors* RALPH K. BARCLAY (Biochemistry), DONALD A. CLARKE (Pharmacology), LEONARD D. HAMILTON (Biology), DORRIS J. HUTCHISON (Microbiology), JOHN A. JACQUEZ (Biology), ROBERT C. MELLORS (Pathology), WILLIAM L. MONEY (Biology), ALICE E. MOORE (Biology), N. CHRISTINE REILLY (Microbiology), HELENE W. TOOLAN (Pathology), MARJORIE BASS ZUCKER (Physiology)

*Assistant Professors* WILLIAM T. BRADNER (Microbiology), A. R. T. DENUES (Biology), CHARLOTTE FRIEND (Microbiology), PHILIP C. MERKER (Biology), WILBUR F. NOYES (Biology), MORRIS N. TELLER (Biology)

Students are directed particularly toward the factors which initiate, control, and modify the growth of normal and neoplastic tissues. Following this orientation, training is available in pharmacology, experimental cancer chemotherapy, microbiology, endocrinology, genetics, and virology.

Prerequisite courses will be determined for each individual on the basis of his particular area of interest.

Brief specialized courses offered include Chemotherapy of Cancer (for physicians and research workers), two weeks in October; Heterologous Transplantation of Human Tumors (for senior investigators), first week of March and of October.

## BIOPHYSICS

*Professor* JOHN S. LAUGHLIN

*Assistant Professors* NATHANIEL BARR, THEODORE HALL, IRA PULLMAN

There are special facilities for radiologic physics (including high-energy phenomena), radiobiology, tracer work (stable and radioactive), radioautography, soft X-ray absorption, electronics, theory and practice of radiation detection.

Prerequisites include acceptable courses in physics, mathematics through calculus, and acceptable laboratory experience, supplemented by studies in fields closely related to biophysics.

## PATHOLOGY

*Professor* FRED W. STEWART

*Associate Professors* FRANK W. FOOTE, JR., LEOPOLD G. KOSS, STEPHEN S. STERNBERG

*Assistant Professors* JOHN W. BERG, WILLIAM D. JOHNSON, LOUIS G. ORTEGA

Special facilities are available for investigation in quantitative cytology and cellular pathology by newer optical methods, cytophysical methods including radioautography, ultraviolet and fluorescent microscopy, and X-ray absorption techniques.

Study in this department is limited to persons holding a medical degree, at least one year of clinical internship, and two years of general pathology.

## PREVENTIVE MEDICINE

*Professor* EMERSON DAY

*Associate Professor* ERNEST L. WYNDER

*Assistant Professors* GENEVIEVE M. BADER, WALTER O'DONNELL, RICHARD H. OSBORNE,  
LOUIS VENET, SAI-HOU YING

Opportunity for clinical experience in methods of cancer detection is offered in the Strang Clinic by arrangement with the department head. Training in cytologic screening and diagnosis is available by special arrangement with the director of the Strang Laboratory of Cytology.

The department offers opportunities for research in early cancer and pre-cancer, cytology, epidemiology of cancer, and biological testing of environmental agents. Special studies in these fields can be arranged with the appropriate members of the department.

Prerequisites are a degree in medicine or advanced training and experience in the field concerned.

A specialized course is offered in Diagnosis and Management of Early Cancer (for physicians), three days in October.

# REGISTER OF STUDENTS

## DOCTORS OF PHILOSOPHY

- Alfredo Giner-Sorolla, Master in Chemistry 1944,  
University of Valencia; Master in Pharmacy 1947,  
Doctorate in Pharmacy, University of Madrid;  
Ph.D. 1958, Cornell University. Major: Biochemistry. Barcelona, Spain
- Louis Kaplan, B.S. 1949, College of the City of New York;  
M.S. 1950, University of Kansas; Ph.D. 1957,  
Cornell University. Major: Microbiology. New York, N.Y.
- Albert S. Kuperman, B.A. 1952, New York University;  
Ph.D. 1957, Cornell University. Major: Pharmacology. New York, N.Y.
- Alexander H. Pinkes, B.S. 1947, University of Connecticut;  
M.S. 1953, University of Kentucky; Ph.D. 1958,  
Cornell University. Major: Microbiology & Immunology. Hartford, Conn.
- Ralph Vinegar, B.A. 1948, M.S. 1949, New York University;  
Ph.D. 1957, Cornell University. Major: Biology. New York, N.Y.

## MASTERS OF SCIENCE

- Robert J. Schulz, B.S. 1950, Queens College; M.S. 1958,  
Cornell University. Major: Physics. Yorktown Heights, N.Y.
- John J. Taylor, B.A. 1953, Hofstra College;  
M.S. 1956, Cornell University. Major: Anatomy. Levittown, N.Y.

## CANDIDATES FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

- Amir Ebrahim Askari, B.S. 1953, University of  
Dubuque; M.S. 1956, New York University.  
Major: Biochemistry. Tehran, Iran
- June L. Biedler, B.A., 1947, Vassar College; M.A. 1954,  
Columbia University. Major: Biology. New York, N.Y.
- Leila C. Diamond, B.A. 1945, University of Wisconsin.  
Major: Biology. New York, N.Y.
- Marie D. Felix, B.S. 1956, The American University.  
Major: Biology. Spring Valley, N.Y.
- David P. Fitzpatrick, B.S. 1955, Boston College.  
Major: Biochemistry. Waltham, Mass.
- Mary Jane Gill Hamilton, B.A. 1947, University of Buffalo;  
B.S. 1950, Polytechnic Institute of Brooklyn.  
Major: Biochemistry. New York, N.Y.
- Abel Alfred Lazzarini, B.A. 1944, College D. F. Sarmiento;  
M.D. 1951, University of Buenos Aires Medical College.  
Major: Biology. Buenos Aires, Argentina

## 24 GRADUATE SCHOOL OF MEDICAL SCIENCES

- Barbara H. Rosenberg, B.A. 1950, Cornell University;  
M.A. 1957, Columbia University. Major: Biochemistry. Kew Gardens, N.Y.
- Herbert Rosenkranz, B.S. 1954, College of the City of  
New York. Major: Biochemistry. New York, N.Y.
- Audrey L. Stone, B.S. 1948, University of Chicago;  
M.S. 1951, University of Southern California.  
Major: Biochemistry. New York, N.Y.
- Sarah Sue Shippey, B.A. 1956, Agnes Scott College;  
M.S. 1957, Emory University. Major: Biochemistry. Columbia, S.C.
- Kathryn Marilyn Smart, B.S. 1945, University of Michigan;  
M.A. 1951, Columbia University. Major: Parasitology. Larchmont, N.Y.
- Bertram Spector, B.E.E. 1945, College of the City of  
New York. Major: Physiology. East Patterson, N.J.
- Bernard Tandler, B.S. 1955, Brooklyn College; M.A. 1957,  
Columbia University. Major: Biology. Brooklyn, N.Y.
- Raymond L. Tanner, B.S. 1953, Memphis State College;  
M.S. 1955, Vanderbilt University. Major: Biophysics. Memphis, Tenn.
- Robert W. Wood, B.S. 1953, University of Detroit;  
M.A. 1955, Vanderbilt University. Major: Biophysics. Detroit, Mich.

## CANDIDATES FOR THE DEGREE OF MASTER OF SCIENCE

- Joan M. Hands, B.Sc. 1953, Hull University College.  
Major: Biophysics. Birmingham, England
- Shirley D. Vickers, B.A. 1954, Vanderbilt University.  
Major: Biophysics. Atlanta, Ga.

## STUDENTS TO ENTER, SEPTEMBER, 1958

- Alex Bloch, B.S. 1954, College of the City of  
New York; M.S. 1958, Long Island University.  
Major: Microbiology. Kew Gardens, N.Y.
- Vincent J. Cairolì, B.S. 1953, Fordham College of  
Pharmacy. Major: Pharmacology. Fairview, N.J.
- Joseph D'Amato, B.S. 1953, College of the City of  
New York. Major: Biochemistry. Brooklyn, N.Y.
- Pauline F. Pecora, B.A. 1952, New York University;  
M.S. 1955, New York University Graduate School.  
Major: Biochemistry. Brooklyn, N.Y.
- Harry Rothman, B.S. 1951, College of the City of  
New York; M.A. 1957, Brooklyn College Graduate  
School. Major: Biology. Brooklyn, N.Y.
- Lloyd M. Stempel, B.S. 1956, College of the City of  
New York. Major: Biochemistry. Bronx, New York, N.Y.